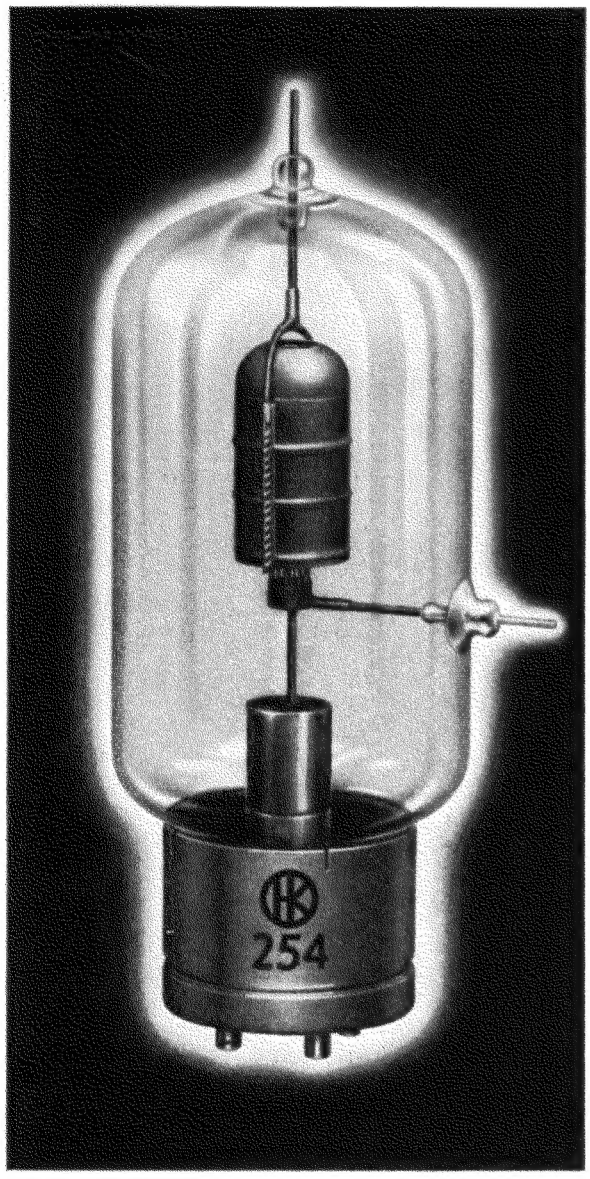
GAMMATRON TYPE 254



GENERAL PURPOSE TRIODE

Medium mu universal triode, 100 watt radiation cooled tantalum plate. Special design permits high voltage operation and unusual VHF efficiency.

PHYSICAL DATA

Plate	Cylindrical Tantalum
Grid	Braced Vertical Bar Tantalum
Filament	Thoriated Tungsten
Net Weight	5 Ounces
Net Weight	6½ Ounces
Shipping Weight	1½ Pounds
Maximum Height	7¼ Inches
Maximum Diameter	2 11/16 Inches

ELECTRICAL DATA

Filament Voltage	5.0 Volts
Filament Current	7.5 Amps
Normal Plate Dissipation	100 Watts
Maximum Average Plate Current	225 MA.
Maximum Average Grid Current	60 MA.
Maximum Plate Voltage	4000 Volts
Average Amplification Constant	25

INTERELECTRODE CAPACITANCES

Grid-Plate	2.7 Mmfd.
Grid-Filament	2.5 Mmfd.
Plate-Filament	0.4 Mmfd.

The Type 254 GAMMATRON is capable of high voltage operation, long life, unusual VHF efficiency and has the ability to stand heavy over-loads. These results are achieved by the use of a tantalum grid and plate in combination with unique Heintz and Kaufman engineering developments.

The plate and grid are mounted on short, sturdy, low resistance leads. Internal insulators are not required while perfect alignment is maintained, thus the interelectrode capacity is low and the insulation high. A plate dome confines the electron stream within the plate, eliminating destructive bombardment of the envelope and plate seal and also improving the plate efficiency. These features combine to give exceptional VHF performance.

The grid seal is protected from failure at very severe VHF loads by means of a silver film. This patented device prevents electrolytic currents from decomposing the glass at the tungsten seal, and thus grid cracks sometimes experienced in ordinary tubes are eliminated.

The use of tantalum and the elimination of unnecessary internal structures makes it possible to exhaust GAMMATRON tubes at very high temperatures. This technique completely eliminates all of the internal gas, the usual "getter" is not necessary, and the tube cannot become soft even due to heavy overloads. The ability of tantalum to reabsorb gas even though operating at high temperatures insures an excellent vacuum permanently, and long filament life.

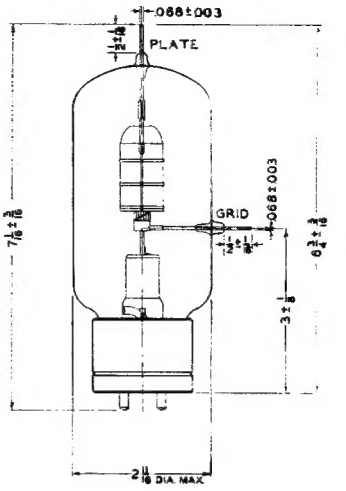
4M 2-46

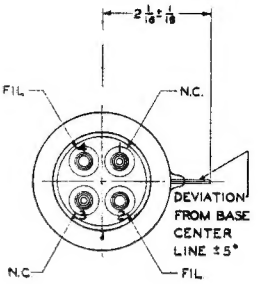
HEINTZ AND KAUFMAN LTD.

SOUTH SAN FRANCISCO, CALIFORNIA, U·S·A

TYPE HK 254

The information on this and the following page does not represent exact conditions of operation to be imposed for any particular situation. Because tubes are used under many widely different conditions Heintz and Kaufman will gladly furnish information for applications which differ appreciably from the illustrative examples given.





4-PIN JUMBO BASE

RADIO FREQUENCY POWER AMPLIFIER CLASS C UNMODULATED*

	Maximum Rating Per Tube	Typical Operation, 1 Tube			
Power Output		400	400	330	125 Watts
Driving Power		12	18	25	25 Watts
DC Plate Voltage	4000	4000	3000	2000	1000 Volts
DC Plate Current	225	125	165	215	225 ma
DC Grid Current	60	30	40	55	60 ma
DC Grid Voltage	−1000	−260	−245	−230	−195 Volts
Peak RF Grid Voltage		450	480	500	480 Volts
Plate Dissipation	100	100	100	100	80 Watts
Plate Input	500	500	500	430	225 Watts

*Carrier conditions for telegraphy.

RADIO FREQUENCY POWER AMPLIFIER CLASS C PLATE MODULATED*

	Maximum Rating Per Tube	Typical Operation, 1 Tube			
Power Output		335	335	275	115 Watts
Driving Power		19	23	25	23 Watts
DC Plate Voltage	3000	3000	2500	2000	1000 Volts
DC Plate Current	180	140	168	180	180 ma
DC Grid Current	60	35	40	45	45 ma
DC Grid Voltage	−800	−355	−360	−355	−315 Volts
Peak RF Grid Voltage		580	610	620	580 Volts
Plate Dissipation	85	85	85	85	65 Watts
Plate Input	420	420	420	360	180 Watts

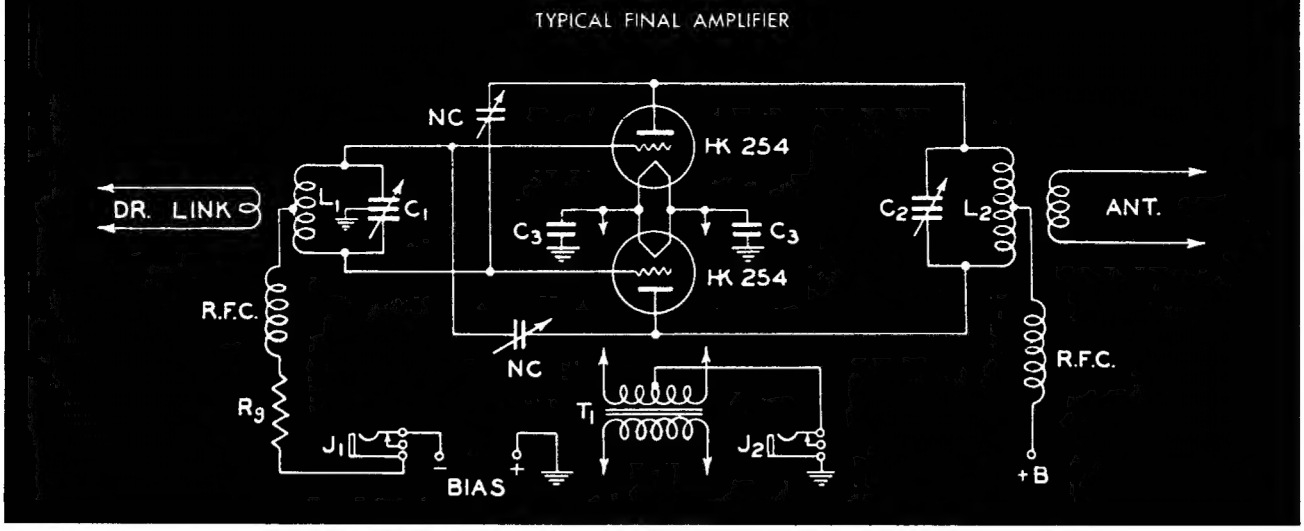
*Carrier conditions for 100% modulation and 60% average value.

AUDIO FREQUENCY POWER AMPLIFIER CLASS B*

	Maximum Ratings Two Tubes	Typical Operation, 2 Tubes			
Power Output		430	420	400	280 Watts
Driving Power**		20	25	47	60 Watts
DC Plate Voltage	3000	3000	2500	2000	1000 Volts
DC Plate Current, Zero Signal		30	40	45	70 ma
DC Plate Current, Max. Signal	500	200	240	280	480 ma
DC Grid Voltage		−110	−80	−60	−15 Volts
Peak AF Grid to Grid Voltage		470	460	520	530 Volts
Plate Dissipation	200	170	180	160	200 Watts
Plate Input, Max. Signal	600	600	600	560	480 Watts
Load Resistance, Plate to Plate		36,400	25,200	16,400	4,000 Ohms

*All data for two tubes.
**Instantaneous power at crest of cycle: effective power is ½ of this value.

TYPICAL FINAL AMPLIFIER



This typical final push-pull amplifier is capable of a maximum unmodulated output of 750 watts and requires a driving power of less than 50 watts. The driver stage may consist of an HK 24 or a pair of 807 tubes which may be link coupled with the grid inductance, L_1. It is advisable to supply enough fixed bias to prevent plate current flow under static conditions (see plate curve), and the remaining bias is then developed by the grid current flow through R_g. Thus: DC grid voltage = Fixed Bias + ($R_g \times$ DC grid current).

COMPONENTS

C_1 — Split-stator transmitting condenser, 100 mmfd. per section 0.07 inch air gap.
C_2 — Split-stator transmitting condenser, 75 mmfd. per section 0.20 inch air gap.
C_3 — .01 mfd. paper condenser.
N.C. — Neutralizing condensers 0.5 to 10 mmfd.
J_1 and J_2 — Jacks to measure grid and cathode current.
R_g — As required by operating conditions (see data).
T_1 — 5.0 volt, 15 ampere filament transformer.

COIL DATA

Band	L_1	L_2
160 Meters	85 turns # 24 DCC Close Wound Diameter 1¾ Inches	30 Turns #12 Length 4½ Inches Diameter 5 Inches
80 Meters	52 Turns #18 Enamel Close Wound Diameter 1¾ Inches	22 Turns #12 Length 3 Inches Diameter 5 Inches
40 Meters	30 Turns #14 Enamel Close Wound Diameter 1¾ Inches	22 Turns #12 Length 3⅝ Inches Diameter 2½ Inches
20 Meters	12 Turns #14 Enamel Length 1⅜ Inches Diameter 1¾ Inches	8 Turns #12 Length 1⅛ Inches Diameter 2½ Inches
10 Meters	6 Turns #14 Enamel Length 1⅜ Inches Diameter 1¾ Inches	6 Turns ¼-Inch Copper Tubing Length 4 Inches Diameter 2½ Inches

VERY HIGH FREQUENCY PERFORMANCE

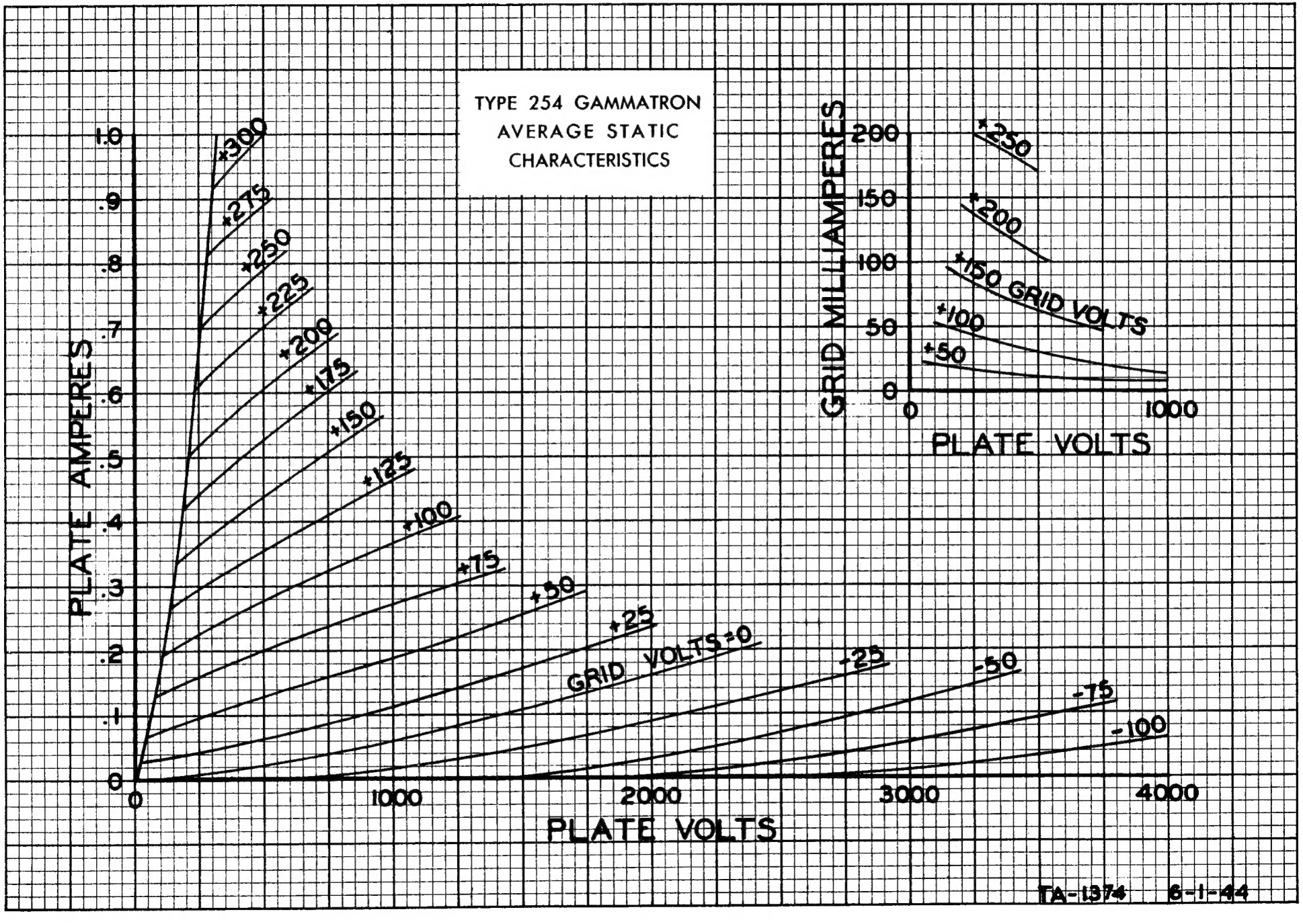
FREQUENCY	30	60	120	200 mc
Class C Unmodulated				
Max. Input	500	430	360	280 Watts
Max. Plate Volts	4000	3200	2700	2300 Volts
Typical Plate Efficiency	80	77	72	64 Percent
Class C Plate Modulated				
Max. Input	420	360	300	230 Watts
Max. Plate Volts	3000	2600	2200	1900 Volts

RADIO FREQUENCY DOUBLER AMPLIFIER

(Feedback neutralized by conventional methods)

	Maximum Rating Per Tube	Typical Operation, 1 Tube		
Power Output		150	125	80 Watts
Driving Power		10	12	12 Watts
DC Plate Voltage	4000	2500	2000	1500 Volts
DC Plate Current	225	100	112	120 ma
DC Grid Current	60	10	12	12 ma
DC Grid Voltage	−1000	−850	−920	−900 Volts
Peak RF Grid Voltage		1050	1150	1125 Volts
Plate Dissipation	100	100	100	100 Watts
Plate Input	250	250	225	180 Watts

Gammatron Tubes


TYPE 254 GAMMATRON
AVERAGE STATIC
CHARACTERISTICS
PLATE AMPERES
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
+300
+275
+250
+225
+200
+175
+150
+125
+100
+75
+50
+25
GRID VOLTS=0
-25
-50
-75
-100
0
1000
2000
3000
4000
PLATE VOLTS
GRID MILLIAMPERES
200
150
100
50
0
+250
+200
+150 GRID VOLTS
+100
+50
0
1000
PLATE VOLTS
TA-1374 6-1-44